96M4220o

Single Board Computer

User's Manual

P/N: B8981230 Version 1.1

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How to Use This Manual

The manual describes how to configure your 96M4220o system to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept and operation of Single Board Computer.

Chapter 1 : System Overview. Presents what you have in the box and give you an overview of the product specifications and basic system architecture for this single board computer.

Chapter 2 : Hardware Configuration. Shows the definitions and locations of Jumpers and Connectors that you can easily configure your system.

Chapter 3 : System Installation. Describes how to properly mount the CPU, main memory and Compact Flash to get a safe installation and provides a programming guide of Watch Dog Timer function.

Chapter 4 : BIOS Setup Information. Specifies the meaning of each setup parameters, how to get advanced BIOS performance and update new BIOS. In addition, POST checkpoint list will give users some guidelines of trouble-shooting.

Chapter 5 : Troubleshooting. Provides various useful tips to quickly get 96M4220o running with success. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

The content of this manual is subject to change without prior notice. These changes will be incorporated in new editions of the document. **DSM** may make supplement or change in the products described in this document at any time.

Updates to this manual, technical clarification, and answers to frequently asked questions will be shown on the following web site : http://www.DSM.AG

Chapter 1
System Overview

1.1 Introduction

Speed is everything of computing which is not golden rule anymore since Intel® introduced MMX Technology, an advanced set of multimedia instruction that accelerated processing of some dedicated tasks. Intel® Pentium® M and Intel® Celeron® M processor is the most shinning mobile processor offering great performance for notebook.

Moreover, Intel® Centrino mobile technology is the essential ingredient for your notebook needs. Optimized for power consumption, it features designed to enable great battery life with low power and power saving. Besides, thermal design power (TDP) of processor also reduced as maximum 27W. Compared to the Intel® Pentium® 4 processor, which is normally from 80W to 103 W, it enables to save two of third power. Along with lower thermal generation, material of processor is not only saved but also noise level of cooler is dropped. Owing to that, the conjunction between processor and cooler is more reliable.

When it comes to the computing performance of Intel® Pentium® M processor, it is optimized and perfect architecture without sacrificing performance and valuable advantages. Some of reports had pointed out that the processor core speed of Intel® Pentium® M is less 50% than Intel® Pentium® 4 if these two processors have the same performance benchmark.

The 96M4220o is based on Intel® Pentium® M and Intel® Celeron® M processor with 400 MHz and 533 MHz front side bus. It means wider choose of processor core speed for customer's product positioning and application. Additionally providing I/O interface for today's scalable application, PCI Express bus, 96M4220o offers PCI-Express x 16 bus for ATI Mobility M22 graphic controller featuring advanced display quality and dual independent display support, such as CRT, LVDS, DVI and TV-out. The I/O bandwidth of PCI Express x1 bus connects the dual Gigabit Ethernet ports delivering 2.5Gbps of bandwidth per port.

Recently developing lead-free manufacturing standards and processes are the hottest topic affecting your business in Europe. ATI mobility M22 is one for few graphics controllers that will meet RoHS compliance. DSM is committed to delivering RoHS compliance single board computer not only with best quality and functionality to expand your revenue but also put our effort on prevention our motherland.

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1.2 Check List

The 96M4220o package should cover the following basic items:

- ✓ One 96M4220o single board computer
- ✓ One dual Serial ports cable kit
- ✓ One Parallel port cable kit (2.0mm pitch)
- ✓ One FDC cable
- ✓ One IDE cable
- ✓ One 4-pin ATX power control cable for backplane connection
- ✓ Two 7-pin SATA signal cables
- ✓ One Installation Resources CD-Title
- ✓ One booklet of 96M4220o manual

Optional: One bracket with PS/2 keyboard and mouse

If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

1.3 Product Specification

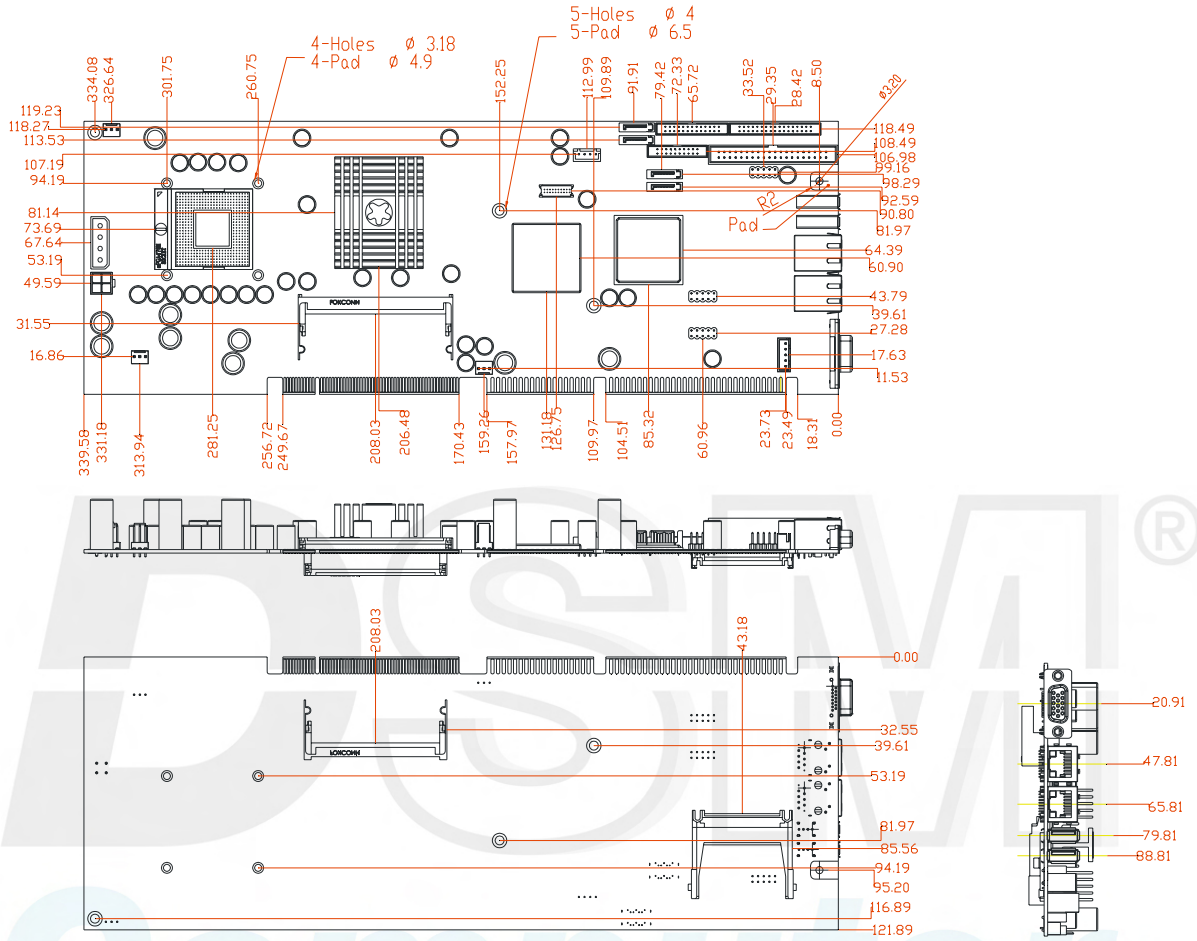
- **Main processor**
  - Intel® Pentium® M/Celeron M Processor (Banias & Dothan)
  - FSB: 533/400MHz
- **BIOS**
  Phoenix (Award) system BIOS with 4Mb Flash ROM with easy upgrade function ACPI, DMI, Green function and Plug and Play Compatible
- **Main Memory**
  - Support dual-channel & signal channel DDR2 memory interface
  - Non-ECC, non-buffered SODIMMS only
  - Two SODIMM sockets support 533/400 DDR2-SDRAM up to 2GB System Memory
- **L2 Cache Memory**
  Built-in Processor
- **Chipset**
  Intel 915GM GMCH and ICH6 chipset
- **Bus Interface**
  - Follow PICMG 1.0 Rev 2.0 standard (32-bit PCI and 16-bit ISA)
  - Fully complies with PCI Local Bus specification V2.2 (support 4 master PCI slots)

- **PCI IDE Interface**
  Support one enhanced IDE port up to two HDD devices with PIO mode 4 and Ultra DMA/33/66/100 mode transfer and Bus Master feature
- **Floppy Drive Interface**
  Support one FDD port up to two floppy drives and 5-1/4"(360K, 1.2MB), 3-1/2" (720K, 1.2MB, 1.44MB, 2.88MB) diskette format and 3-mode FDD
- **Serial Ports**
  Support two high-speed 16C550 compatible UARTs with 16-byte T/R FIFOs
- **IR Interface**
  Support one 6-pin header for serial Standard Infrared wireless communication
- **Parallel Port**
  Support one parallel port with SPP, EPP and ECP modes
- **USB Interface**
  Support four USB (Universal Serial Bus) ports for high-speed I/O peripheral devices
- **PS/2 Mouse and Keyboard Interface**
  Support one 8-pin connector for external PS/2 keyboard/mouse connection and one 5-pin shrouded connector for PS/2 keyboard connection through backplane connection
- **ATX Power Control Interface**
  One 4-pin header to support ATX power control with Modem Ring-On and Wake-On-LAN function
- **Auxiliary I/O Interfaces**
  System reset switch, external speaker, Keyboard lock and HDD active LED, etc
- **Real Time Clock/Calendar (RTC)**
  Support Y2K Real Time Clock/Calendar with battery backup for 7-year data retention
- **Watchdog Timer**
  - Support WDT function through software programming for enable/disable and interval setting
  - Generate system reset
- **CompactFlash**
  - True IDE mode, compatibles with the ATA/ATAPI-4 specification
  - One Type II CF socket on secondary IDE channel for supporting up to 1GB memory
  - Bootable for no drives on primary channel
- **On-board VGA**
  - GMCH integrated graphics, 266MHz core frequency; share system memory up to 224MB for system with greater than or equal to 512MB of system memory

- ✓ Support Dual channel LVDS interface
- ✓ Support TV output

- **On-board Ethernet LAN**
  Marvell 88E8053 or 88E8052 Gigabit Ethernet to support RJ-45 connector
- **High Driving GPIO**
  Support 8 programmable high driving GPIO
- **Cooling Fans**
  Support three 3-pin headers for CPU, System and ATI Mobility M22 fans
- **System Monitoring Feature**
  Monitor CPU temperature, system temperature and major power sources, etc
- **Bracket**
  Support dual Ethernet port with 2 indicators, dual USB ports and one CRT port
- **Outline Dimension (L X W):**
  338.5mm (13.33") X 122mm (4.8")
- **Power Requirements:**
  - +12V@1.58A
  - +5V @5.41A
  - Test configuration:
    - CPU: Intel Pentium M (Dothan) – 1.6GHz/400MHz FSB/2MB L2 Cache
    - Memory: DDR2 SDRAM 256MBx2
    - Primary Master IDE HDD: Maxtor-6Y120L0
    - OS: Microsoft Windows 2000 Professional + SP4
    - Test Programs: 3D Mark 2001 PRO for loading VGA and Burning Test V4.0 for loading CPU
    - Run Time: 10 minutes
- **Operating Temperature:**
  -5°C ~ 60°C
- **Storage Temperature:**
  -20°C ~ 80°C
- **Relative Humidity:**
  0% ~ 95%, non-condensing

1.3.1 Mechanical Drawing

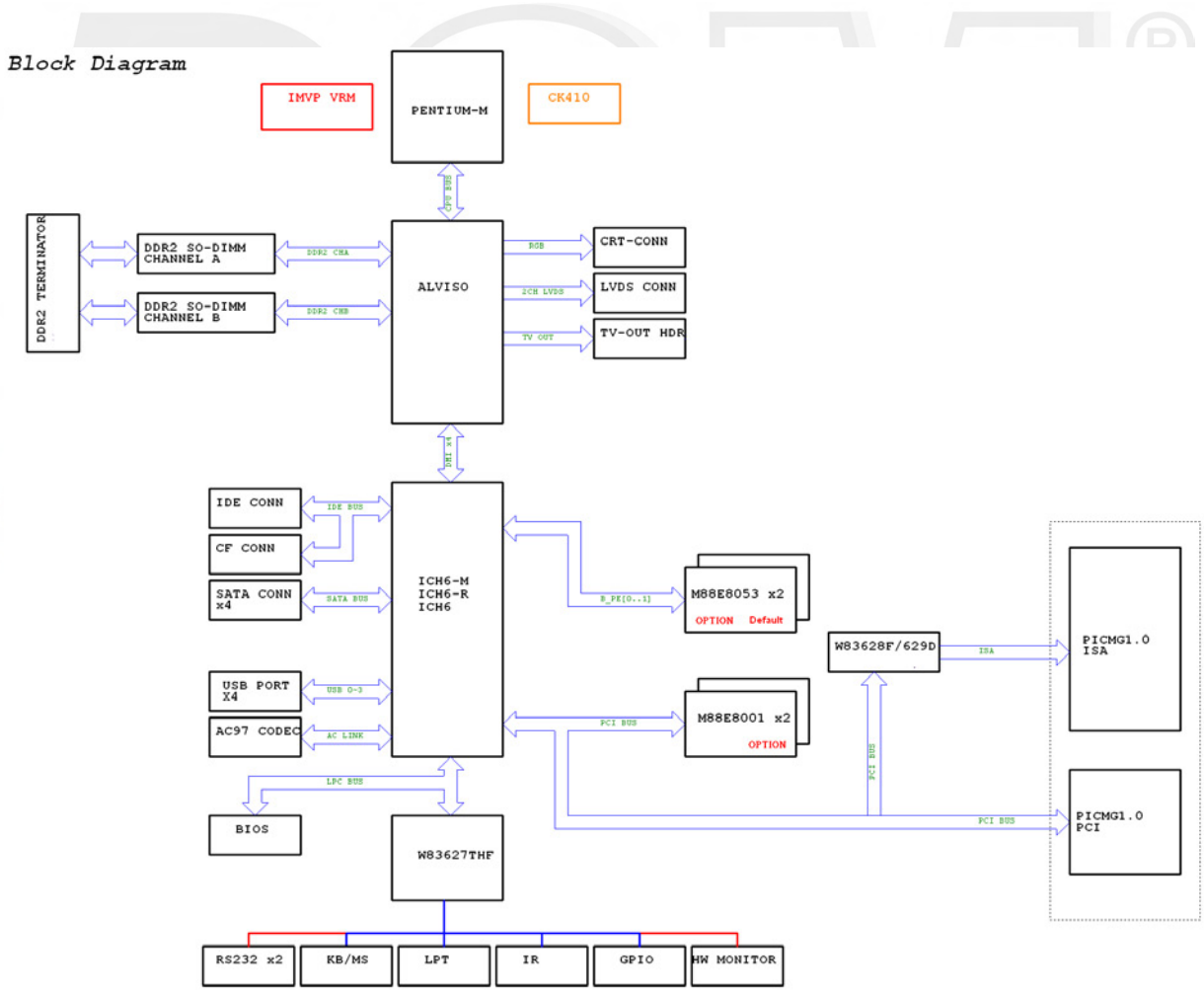


1.4 System Architecture

96M4220o includes Intel chipset 915GM supports Pentium M/Celeron M processor, DDR2 SDARM, 2D/3D graphics display that cover CRT, LVDS, TV-out and ICH6 supports PCI bus interface, APM, ACPI compliant power management, USB ports, SMBus communication, Ultra DMA 33/66/100 IDE channel and SATA ports.

W83628F is a PCI-to-ISA bus conversion IC and W83629D is a condensed centralizes IC for IRQ and DMA control, together form a complete set for the PCI-to-ISA Bridge.

Super I/O chip, W83627THF is responsible for PS/2 keyboard/mouse, UARTs, FDC, hardware monitor, Parallel, Watch Dog Timer and Infrared interface.



96M4220o System Block Diagram

Chapter 2
Hardware Configuration

This chapter gives the definitions and shows the positions of jumpers, headers and connectors. All of the configuration jumpers on 96M4220o is in the proper position. The default settings shipped from factory are marked with a star (★).

2.1 Jumper Setting

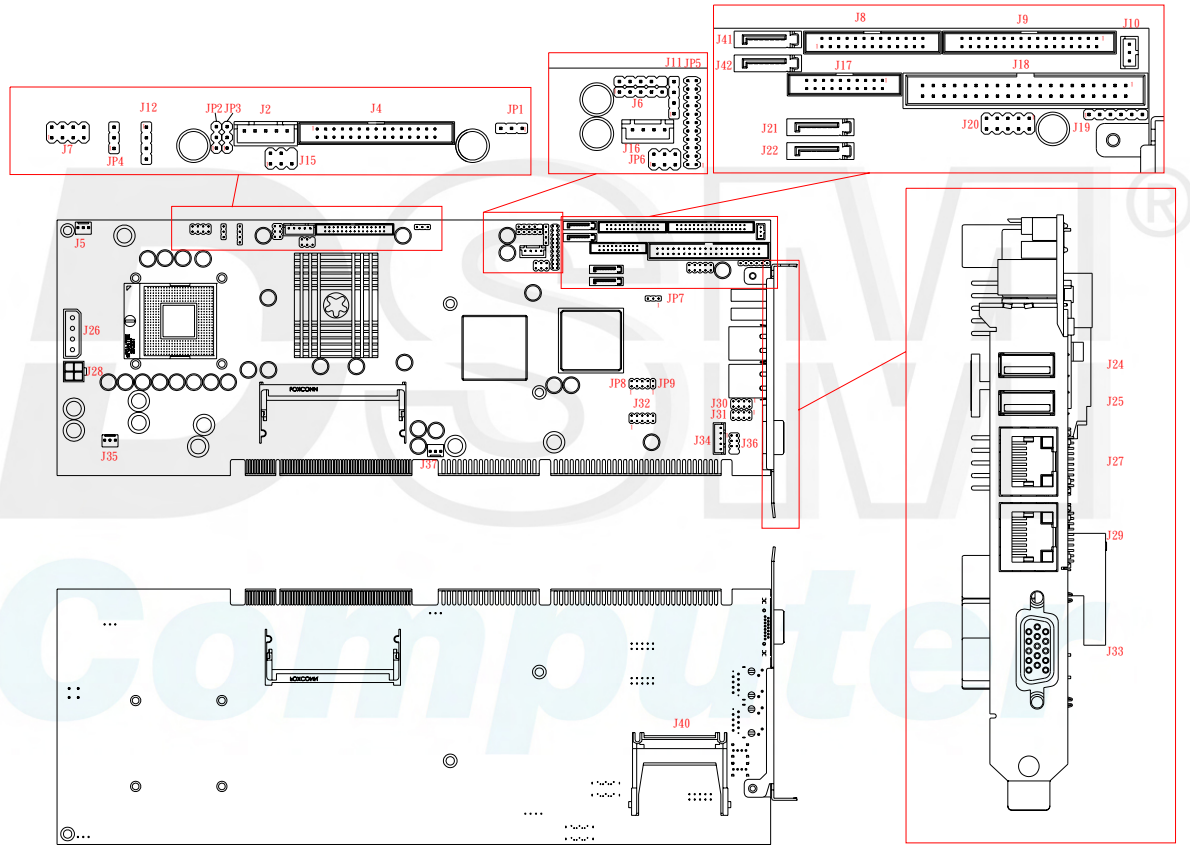


Figure 2-1 Jumper/Connector Location

JP1 : LVDS Power Level

JP1	Function
1-2	3.3V ★
2-3	5V

JP2 : CPU Type

JP2	Function
1-2	Banias ★
2-3	Dothan

JP3 : LVDS Back-light Power Level

JP3	Function
1-2	3.3V ★
2-3	5V

JP4 : CPU FSB Frequency Selection

JP4	Function
1-2	400 MHz ★
2-3	533 MHz

JP5 : COM2 RS232/485/422 Selection

JP5	Function
RS232	5-6,9-11,10-12,15-17,16-18 ★
RS485	1-2,7-9,8-10,19-20
RS422	3-4,7-9,8-10,13-15,14-16,21-22

JP6 : AT/ATX Power Supply Selection

JP6	Function
3-5, 4-6	ATX Power Supply ★
1-3, 2-4	AT Power Supply

JP7 : RTC CMOS Clear Jumper Setting

JP7	Function
1-2	Clear CMOS Contents
2-3	Normal Operation ★

JP8 : LVDS Panel Resolution Selection

JP8	Function
1-2,3-4,5-6,7-8	Panel type select by BIOS setting ★
3-4,5-6,7-8	640x480 18bit 1CH
1-2,5-6,7-8	800x600 18bit 1CH
5-6,7-8	1024X768 18bit 1CH
1-2,3-4,7-8	1024X768 24bit 1CH
3-4,7-8	1280X768 24bit 1CH
1-2,7-8	1280X1024 24bit 2CH
7-8	1400X1050 18bit 2CH
1-2,3-4,5-6	1600x1200 24bit 2CH

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2.2 Connector Allocation

I/O peripheral devices are connected to the interface connectors on this single board computer.

Connector Function List

Connector	Description	Remark
J2	LVDS Panel Back-light Power Connector	
J4	LVDS Panel Connector	
J5/J35/J37	Fan Connector	
J6	On-Board AC97 Audio Header	
J7	Miscellaneous Header	
J8	Parallel Port Connector	
J9	FDC Interface Connector	
J10	External Wake on Ring Header	
J11	CD-IN Header	
J12	External Speaker Header	
J15	TV Out Connector	
J16	ATX Standby Power Connector	
J17	Serial Port-1/Port-2 Connector	
J18	IDE0 Interface Connector	
J19	IR Header	
J20	8-Bit GPIO Header	
J21/J22 J41/J42	Serial ATA 1 /2/3/4	
J24/J25	Bracket Side USB Connector	
J26	4P Power Connector (Auxiliary Power)	
J27/J29	Ethernet RJ-45 Interface Connector	
J28	4P Power Connector for CPU 12V Power	
J30/J31	Ethernet LED Header	
J32	Dual Port USB Header	
J33	D-SUB 15 VGA Connector	
J34	External Keyboard Connector	
J36	PS/2 Keyboard/Mouse Connector	
J40	Compact Flash Socket on IDE1 Master	

Pin Assignments of Connectors

J2 : LVDS Panel Back-light Power Connector

PIN No.	Signal Description
1	+5V
2	GND
3	+12V
4	GND
5	Backlight Power (select by JP3)

J5/J35/J37 : Fan Connector

PIN No.	Signal Description
1	GND
2	+12V
3	Speed Sense to SIO

J4 : LVDS Panel Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	VDD_LVDS	2	VDD_LVDS
3	LVDSA_DATA0	4	LVDSA_DATA0#
5	LVDSA_DATA1	6	LVDSA_DATA1#
7	LVDSA_DATA2	8	LVDSA_DATA2#
9	LVDSA_DATA3	10	LVDSA_DATA3#
11	LVDSA_CLKP	12	LVDSA_CLKN
13	NC	14	NC
15	Ground	16	Ground
17	LVDSB_DATA0	18	LVDSB_DATA0#
19	LVDSB_DATA1	20	LVDSB_DATA1#
21	LVDSB_DATA2	22	LVDSB_DATA2#
23	LVDSB_DATA3	24	LVDSB_DATA3#
25	LVDSB_CLKP	26	LVDSB_CLKN
27	NC	28	NC
29	Ground	30	Ground

J6 : On-Board AC97 Audio Header

PIN No.	Signal Description
1	MIC Power
2	AGND
3	LINE IN Left
4	AGND
5	LINE IN Right
6	AGND
7	LINE OUT Left
8	AGND
9	LINE OUT Right

J7 : Miscellaneous Header

PIN No.	Signal Description
1	5VSB
2	Power Suspend Signal
3	+3.3V
4	HDD Power Signal
5	5VSB
6	Power On
7	Reset
8	GND

J8 : Parallel Port Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Strobe#	14	Auto form Feed#
2	Data 0	15	Error#
3	Data 1	16	Initialization#
4	Data 2	17	Printer Select IN#
5	Data 3	18	Ground
6	Data 4	19	Ground
7	Data 5	20	Ground
8	Data 6	21	Ground
9	Data 7	22	Ground
10	Acknowledge#	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Printer Select	26	N/C

J9 : FDC Interface Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	GND	2	Density Select 0
3	GND	4	N/C
5	GND	6	Density Select 1
7	GND	8	Index#
9	GND	10	Motor ENA#
11	GND	12	Drive Select B#
13	GND	14	Drive Select A#
15	GND	16	Motor ENB#
17	GND	18	Direction#
19	GND	20	Step#
21	GND	22	Write Data#
23	GND	24	Write Gate#
25	GND	26	Track 0#
27	GND	28	Write Protect#
29	N/C	30	Read Data#
31	GND	32	N/C
33	N/C	34	Disk Change#

J10 : External Wake on Ring Header

PIN No.	Signal Description
1	5VSB
2	GND
3	RI

J11 : CD-IN Header

PIN No.	Signal Description
1	CD-L
2	CDGND
3	CDGND
4	CD-R

J12 : External Speaker Header

PIN No.	Signal Description
1	Speaker
2	NC
3	NC
4	+5V

J15 : TV Out Connector

PIN No.	Signal Description
1	GND
2	TVDACA
3	TVDACB
4	TVDACC
5	GND

J16 : ATX Standby Power Connector

PIN No.	Signal Description
1	ATX Power OK
2	ATX_5VSB
3	PS ON
4	GND

J17 : Serial Port-1/Port-2 Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Data Carrier Detect (DCD1)	2	Data Set Ready (DSR1)
3	Receive Data (RXD1)	4	Request to Send (RTS1)
5	Transmit Data (TXD1)	6	Clear to Send (CTS1)
7	Data Terminal Ready (DTR1)	8	Ring Indicator (RI1)
9	GND	10	NC
11	Data Carrier Detect (DCD2)	12	Data Set Ready (DSR2)
13	Receive Data (RXD2)	14	Request to Send (RTS2)
15	Transmit Data (TXD2)	16	Clear to Send (CTS2)
17	Data Terminal Ready (DTR2)	18	Ring Indicator (RI2)
19	GND	20	NC

J18 : IDE0 Interface Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	RESET#	2	Ground
3	Data 7	4	Data 8
5	Data 6	6	Data 9
7	Data 5	8	Data 10
9	Data 4	10	Data 11
11	Data 3	12	Data 12
13	Data 2	14	Data 13
15	Data 1	16	Data 14
17	Data 0	18	Data 15

19	Ground	20	N/C
21	DMA REQ	22	Ground
23	IOW#	24	Ground
25	IOR#	26	Ground
27	IOCHRDY	28	Pull-down
29	DMA ACK#	30	Ground
31	INT REQ	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD Active#	40	Ground

J19 : IR Header

PIN No.	Signal Description
1	+5V
2	GND
3	IRRX
4	GND
5	IRTX
6	NC

J20 : 8-Bit GPIO Header

PIN No.	Signal Description
1	GPIO0
2	GPIO4
3	GPIO1
4	GPIO5
5	GPIO2
6	GPIO6
7	GPIO3
8	GPIO7
9	GND
10	+5V

J21/J22/J41/J42 : Serial ATA 1 /2/3/4

PIN No.	Signal Description
1,4,7	GND
2	TXP
3	TXN
5	RXN
6	RXP

J24/J25 : Bracket Side USB Connector

PIN No.	Signal Description
1	Vcc (Stand By)
2	D-
3	D+
4	GND

J26 : 4P Power Connector (Auxiliary Power)

PIN No.	Signal Description
1	+12V
2	GND
3	GND
4	+5V

J27/J29 : Ethernet RJ-45 Interface Connector

PIN No.	Signal Description
1	MDI_2P
2	MDI_0P
3	MDI_0N
4	+1.8V
5	MDI_2N
6	MDI_3P
7	GND
8	MDI_1P
9	MDI_1N
10	MDI_3N
11	ACT#
12	LINK#
13	LINK100#
14	LINK1000#

J28 : 4P Power Connector for CPU 12V Power

PIN No.	Signal Description
1	GND
2	GND
3	+12V
4	+12V

J30/J31 : Ethernet LED Header

PIN No.	Signal Description
1	Link#
2	Link# pull high
3	Active#
4	Active# pull high
5	Link10/100
6	Link10/100 pull high
7	Link1000
8	Link1000 pull high

J32 : Dual Port USB Header

PIN No.	Signal Description
1	NC
2	VCC
3	Shield GND
4	D0-
5	D1+
6	D0+
7	D1-
8	Shield GND
9	VCC
10	GND

J33 : D-SUB 15 VGA Connector

PIN No.	Signal Description
1	RED
2	GREEN
3	BLUE
4	NC
5	GND
6	GND
7	GND
8	GND
9	NC
10	GND
11	NC
12	DDC DATA
13	HSYNC
14	VSYNC
15	DDC CLK

J34 : External Keyboard Connector

PIN No.	Signal Description
1	Keyboard Clock
2	Keyboard Data
3	NC
4	GND
5	+5V

J36 : PS/2 Keyboard/Mouse Connector

PIN No.	Signal Description
1	Keyboard Data
2	Mouse Data
3	GND
4	+5V
5	Keyboard Clock
6	Mouse Clock
7	N/C
8	N/C

J40 : CompactFlash Socket on IDE0 Master

PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	2	Data 3
3	Data 4	4	Data 5
5	Data 6	6	Data 7
7	SDCS#0	8	Ground
9	Ground	10	Ground
11	Ground	12	Ground
13	+5V	14	Ground
15	Ground	16	Ground
17	Ground	18	SA2
19	SA1	20	SA0
21	Data 0	22	Data 1
23	Data 2	24	NC
25	NC	26	NC
27	Data 11	28	Data 12
29	Data 13	30	Data 14
31	Data 15	32	SDCS#3
33	Ground	34	IOR#
35	IOW#	36	WE#
37	INT	38	+5V
39	Ground	40	NC
41	RESET#	42	IORDY
43	NC	44	REQ
45	IDEACT#	46	PDIAG#
47	Data 8	48	Data 9
49	Data 10	50	Ground

Chapter 3
System Installation

This chapter provides you with instructions to set up your system. The additional information is enclosed to help you set up onboard PCI device and handle WDT operation in software programming.

3.1 Pentium M Processor

Installing mPGA 479M CPU

1) Disengaging the Socket Actuator, use a screwdriver to disengage (open) the socket actuator.

2) Align the processor pins with pin holes on the socket. Make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end. Then press the CPU gently until it fits into place. If this operation is not easy or smooth, don't do it forcibly. You need to check and rebuild the CPU pin uniformly.

3) While gently holding the processor down with your finger, secure the processor in the socket by closing the socket actuator with a screwdriver.

4) Follow the installation guide of cooling fan or heat sink to mount it on CPU surface and lock it on the socket 479M.

Note:
You should know Pentium M / Celeron M processor need extra 12V power source. DON'T FORGET TO CONNECT 4-pin 12V connector to J28!

J28 : 4P Connector for CPU 12V Power

PIN No.	Signal Description
1	GND
2	GND
3	+12V
4	+12V

Removing CPU

1) Unlock the cooling fan first.
2) Lift the lever of CPU socket outwards and upwards to the other end.
3) Carefully lifts up the existing CPU to remove it from the socket.
4) Follow the steps of installing a CPU to change to another one or place handling bar to close the opened socket.

Configuring System Bus

96M4220o will automatically detect the CPU used. CPU speed of Intel Pentium M can be detected automatically.

JP2 : CPU Type

JP2	Process Selection
1-2	Banias ★
2-3	Dothan

JP4 : CPU FSB Frequency Select

JP4	Process Selection
1-2	100 MHz ★
2-3	133 MHz

3.2 Main Memory

The 96M4220o provides two 2 x 200-pin SODIMM sockets (dual channel) support 1.8V DDR2 400/533 non-ECC DIMMs as on-board main memory. The maximum memory size can be up to 2GB. Auto detecting memory clock according to BIOS CMOS settings.

For system compatibility and stability, don't use memory module without brand. You can also use only one double-sided DIMM in either one DIMM slot or two single-sided DIMM in both sockets.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install your DRAM module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

Note:
To maintain system stability, don't change any of DRAM parameters in BIOS setup to upgrade your system performance without acquiring technical information.

Memory frequency / CPU FSB synchronization

Memory frequency supported by 96M4220o depending on front side bus of CPU, carefully choosing memory type according to the processor you want to install on the board. Following is table that helps you to select right memory type according to different processor FSB.

CPU FSB	Memory Frequency
533MHz	533/400MHz
400MHz	400MHz

3.3 Installing the Single Board Computer

To install your 96M4220o single board computer into standard chassis or proprietary environment, you need to perform the following:

Step 1: Check all jumpers setting on proper position
Step 2: Install and configure CPU and memory module on right position
Step 3: Place your 96M4220o into the dedicated position in your system
Step 4: Attach cables to existing peripheral devices and secure it

WARNING

Please ensure that your SBC is properly inserted and fixed by mechanism. Otherwise, the system might be unstable or do not work due to bad contact of PICMG 1.0 PCI plus ISA-bus slot.

Note:
Please refer to section 3-3-1 to 3-3-4 to install INF/VGA/LAN/Audio drivers.

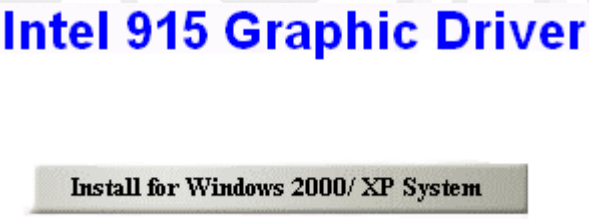
Install Chipset Driver
Install Intel Graphic Driver
Install Marvell Ethernet Driver
Install AC97 Audio Driver
Install Microsoft Direct X 8.1
Install Adobe Acrobat Reader

3.3.1 Chipset Component Driver

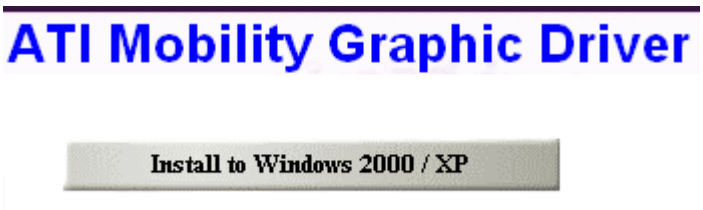
The chipset on 96M4220o is a new chipset that a few old operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows 2000/XP, please install its INF before any of other Drivers are installed. You can find very easily this chipset component driver in the 96M4220o CD-title. OS needs to modify according to OS that supported by Intel® 915GM & ICH6.

3.3.2 Intel Integrated Graphics GMCH Chip

Please find Intel 915 Graphic driver in the 96M4220o CD-title. Drivers support Windows 2000 / XP.



Please find ATI Mobility Graphic driver in the 96M4220o CD-title. Drivers support Windows 2000 / XP.



3.3.3 On-board Gigabit Ethernet Controller

Drivers Support

Please find Marvell 88E8053 (via PCI-E) driver in /Ethernet directory in the 96M4220o CD-title. The drivers support Windows 2000 / XP.

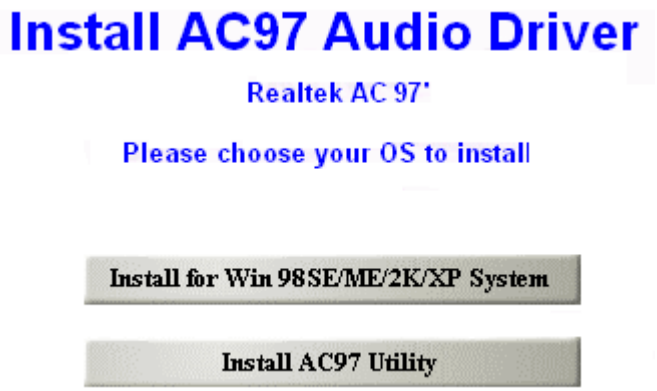
LED Indicator (for LAN status)

The 96M4220o provides three LED indicators to report Ethernet interfaces status. Please refer to the table below as a quick reference guide.

88E8053	Name of LED	Operation of Ethernet Port	
		ON	OFF
Green	LAN Linked & Active LED	Linked	Active (Blinking)
	LAN speed LED		
All Off		N/A	10 Mbps
Green	Speed LED	100 Mbps	N/A
Amber	Speed LED	1000 Mbps	N/A

3.3.4 On-board AC-97 Audio Device

Please find Realtek AC'97 Audio driver in the 96M4220o CD-title. The drivers support Windows 98SE / ME / 2000 / XP, and AC97 Utility.


Install AC97 Audio Driver
Realtek AC 97'
Please choose your OS to install
Install for Win 98SE/ME/2K/XP System
Install AC97 Utility

3.4 Clear CMOS Operation

The following table indicates how to enable/disable CMOS Clear Function hardware circuit by putting jumpers at proper position.

JP7 : RTC CMOS Clear Jumper Setting

JP7	Process Selection
1-2	Normal Operation ★
2-3	Clear CMOS Contents

To correctly operate CMOS Clear function, users must turn off the system, move JP7 jumper to short pin 2 and 3. To clear CMOS contents, please turn the power back on and turn it off again for AT system, or press the toggle switch a few times for ATX system. Move the JP7 back to 1-2 position (Normal Operation) and start the system. Users then load BIOS default setting.

3.5 WDT Function

The working algorithm of the WDT function can be simply described as a counting process. The Time-Out Interval can be set through software programming. The availability of the time-out interval settings by software or hardware varies from boards to boards.

The 96M4220o allows users control WDT through dynamic software programming. The WDT starts counting when it is activated. It sends out a signal to system reset, when time-out interval ends. To prevent the time-out interval from running out, a re-trigger signal will need to be sent before the counting reaches its end. This action will restart the counting process. A well-written WDT program should keep the counting process running under normal condition. WDT should never generate a system reset unless the system runs into troubles.

The related Control Registers of WDT are all included in the following sample program that is written in C language. User can fill a non-zero value into the Time-out Value Register to enable/refresh WDT. System will be reset after the Time-out Value to be counted down to zero. Or user can directly fill a zero value into Time-out Value Register to disable WDT immediately. To ensure a successful accessing to the content of desired Control Register, the sequence of following program codes should be step-by-step run again when each register is accessed.

Additionally, there are maximum 2 seconds of counting tolerance that should be considered into user' application program. For more information about WDT, please refer to Winbond W83627THF data sheet.

There are two PNP I/O port addresses that can be used to configure WDT,
1) 0x2E:EFIR (Extended Function Index Register, for identifying CR index number)
2) 0x2F:EFDR (Extended Function Data Register, for accessing desired CR)

Below are some example codes, which demonstrate the use of WDT.

```
// Enter Extended Function Mode
outp(0x002E, 0x87);
outp(0x002E, 0x87);
// Assign Pin 89 to be a WDTO
outp(0x002E, 0x2B);
outp(0x002F, inp(0x002F) & 0xEF);
// Select Logic Device 8
outp(0x002E, 0x07);
outp(0x002F, 0x08);
// Active Logic Device 8
outp(0x002E, 0x30);
outp(0x002F, 0x01);
// Select Count Mode
outp(0x002E, 0xF5);
outp(0x002F, (inp(0x002F) & 0xF7) | ( Count-mode Register  & 0x08));
// Specify Time-out Value
outp(0x002E, 0xF6);
outp(0x002F,  Time-out Value Register );
// Disable WDT reset by keyboard/mouse interrupts
outp(0x002E, 0xF7);
outp(0x002F, 0x00);
// Exit Extended Function Mode
outp(0x002E, 0xAA);
```

Definitions of Variables:

Value of Count-mode Register:
1) 0x00 -- Count down in seconds (Bit3=0)
2) 0x08 -- Count down in minutes (Bit3=1)
Value of Time-out Value Register:
1) 0x00 -- Time-out Disable
2) 0x01~0xFF -- Value for counting down

3.6 GPIO

The 96M4220o provides 8 programmable input or output ports that can be individually configured to perform a simple basic I/O function. Users can configure each individual port to become an input or output port by programming register bit of I/O Selection. To invert port value, the setting of Inversion Register has to be made. Port values can be set to read or write through Data Register.

Pin assignment

J20 : 8-Bit GPIO Header

PIN No.	Signal Description
1	General Purpose I/O Port 0 (GPIO0)
2	General Purpose I/O Port 4 (GPIO4)
3	General Purpose I/O Port 1 (GPIO1)
4	General Purpose I/O Port 5 (GPIO5)
5	General Purpose I/O Port 2 (GPIO2)
6	General Purpose I/O Port 6 (GPIO6)
7	General Purpose I/O Port 3 (GPIO2)
8	General Purpose I/O Port 7 (GPIO7)
9	Ground
10	+5V

All General Purpose I/O ports can only apply to standard TTL ± 5% signal level (0V/5V), and each source sink capacity up to 12mA.

96M4220o GPIO Programming Guide

There are 8 GPIO pins on the 96M4220o. These GPIO pins are from SUPER I/O (W83627THF) GPIO pins, and can be programmed as Input or Output direction. J20 pin header is for 8 GPIO pins and its pin assignment as following :

J20_Pin1=GPIO0:from SUPER I/O_GPIO10 with Ext. 4.7K PH
J20_Pin2=GPIO4:from SUPER I/O_GPIO14 with Ext. 4.7K PH
J20_Pin3=GPIO1:from SUPER I/O_GPIO11 with Ext. 4.7K PH
J20_Pin4=GPIO5:from SUPER I/O_GPIO15 with Ext. 4.7K PH
J20_Pin6=GPIO2:from SUPER I/O_GPIO12 with Ext. 4.7K PH
J20_Pin7=GPIO6:from SUPER I/O_GPIO16 with Ext. 4.7K PH
J20_Pin8=GPIO3:from SUPER I/O_GPIO13 with Ext. 4.7K PH
J20_Pin9=GPIO7:from SUPER I/O_GPIO17 with Ext. 4.7K PH

<<<<< Be careful Pin9=GND , Pin10=VCC >>>>>

There are several Configuration Registers (CR) of W83627THF needed to be programmed to control the GPIO direction, and status(GPI)/value(GPO). CR02h ~ CR2F are common (global) registers to all Logical Devices (LD) in W83627THF. CR07h contains the Logical Device Number that can be changed to access the LD as needed. LD7 contains the GPIO10~17 registers.

Programming Guide:

Step1: CR29_Bit [7.6]. P [0,1]; to select multiplexed pins as GPIO10~17 pins
Step2: CR07h.P [07h]; Point to LD7
Step3: LD7_CR30h_Bit0.P1; Enable LD7
Step4: Select GPIO direction, Get Status or output value.

LD7_CRF0h; GPIO17 ~ 10 direction, 1 = input, 0 = output pin
LD7_CRF2h.P[00h]; Let CRF1 (GPIO data port) non-invert to prevent from confusion
LD7_CRF1h; GPIO17~10 data port, for input pin, get status from the related bit, for output pin, write value to the related bit.

For example,

LD7_CRF0h_Bit4.P0; Let GPIO14 as output pin
LD7_CRF2h_Bit4.P0; Let CRF1_Bit4 non-inverted
LD7_CRF1h_Bit4.P0; Output "0" to GPIO14 pin (J20_Pin2)
LD7_CRF0h_Bit0.P1; Let GPIO10 as input pin
LD7_CRF2h_Bit0.P0; Let CRF1_Bit0 non-inverted
Read LD7_CRF1h_Bit0; Read the status from GPIO10 pin (J20_Pin1)

How to access W83627THF CR?
In ROBO-8718 Series, the EFER = 002Eh, and EFDR = 002Fh.
EFER and EFDR are 2 IO ports needed to access W83627THF CR.
EFER is the Index Port, EFDR is the Data Port.
CR index number needs to be written into EFER first,
Then the data will be read/written from/to EFDR.
To R/W W83627THF CR, it is needed to Enter/Enable Configuration Mode first.
When completing the programming, it is suggested to Exit/Disable Configuration Mode.

Enter Configuration Mode: Write 87h to IO port EFER twice.
Exit Configuration Mode: Write AAh to IO port EFER.

Example

Define GPIO4 as output pin, and output "0" to this pin.

```
mov dx,2eh ; Enter Configuration Mode
mov al,87h
out dx,al
jmp $+2
out dx,al

mov dx,2eh
mov al,29h ; Read CR29
out dx,al
mov dx,2fh
in al,dx
and al,3Fh
or al,40h ; CR29_Bit[7..6].P[0,1]
mov ah,al

mov dx,2eh
mov al,2Ah
out dx,al
mov dx,2fh
mov al,ah
out dx,al

mov dx,2eh
mov al,07h ; Point to LDN7
out dx,al
mov dx,2fh
mov al,07h
out dx,al

mov dx,2eh ; Read CR30
mov al,30h
out dx,al
mov dx,2fh
in al,dx
or al,01h
mov ah,al
mov dx,2eh ; CR30_Bit0.P1
mov al,30h
out dx,al
mov dx,2fh
mov al,ah
out dx,al
```

```
mov dx,2eh
mov al,0f0h ; Read LD7_CRF0
out dx,al
mov dx,2fh
in al,dx
and al,0efh
mov ah,al

mov dx,2eh
mov al,0f0h ; LD7_CRF0_Bit4.P0
out dx,al
mov dx,2fh
mov al,ah
out dx,al

mov dx,2eh
mov al,0f2h ; Read LD7_CRF2
out dx,al
mov dx,2fh
in al,dx
and al,0efh
mov ah,al

mov dx,2eh
mov al,0f2h ; LD7_CRF2_Bit4.P0
out dx,al
mov dx,2fh
mov al,ah
out dx,al

mov dx,2eh
mov al,0f1h ; Read LD7_CRF1
out dx,al
mov dx,2fh
in al,dx
and al,0efh
mov ah,al

mov dx,2eh
mov al,0f1h ; LD7_CRF1_Bit4.P0
out dx,al
mov dx,2fh
mov al,ah
out dx,al
```

```
mov dx,2eh ; Exit Configuration Mode
mov al,0AAh
out dx,al
```

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Chapter 4
BIOS Setup Information

The 96M4220o is equipped with the AWARD BIOS stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, the 96M4220o communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start-up.

4.1 Entering Setup

Turn on or reboot the computer. When the message "Hit <DEL> if you want to run SETUP" appears, press <Del> key immediately to enter BIOS setup program.

If the message disappears before you respond, but you still wish to enter Setup, please restart the system to try "COLD START" again by turning it OFF and then ON, or touch the "RESET" button. You may also restart from "WARM START" by pressing <Ctrl>, <Alt>, and <Delete> keys simultaneously. If you do not press the keys at the right time and the system will not boot, an error message will be displayed and you will again be asked to,

Press <F1> to Run SETUP or Resume

In HIFLEX BIOS setup, you can use the keyboard to choose among options or modify the system parameters to match the options with your system. The table below will show you all of keystroke functions in BIOS setup.

General Help	
↑ ↓ → ←	: Move
Enter	: Select
+ / - /PU /PD	: Value
ESC	: Exit
F1	: General Help
F2	: Item Help
F5	: Previous Values
F6	: Fail-Safe Defaults
F7	: Optimized Defaults
F9	: Menu in BIOS
F10	: Save

4.2 Main Menu

Once you enter 96M4220o AWARD BIOS CMOS Setup Utility, you should start with the Main Menu. The Main Menu allows you to select from eleven setup functions and two exit choices. Use arrow keys to switch among items and press <Enter> key to accept or bring up the sub-menu.

Phoenix- AwardBIOS CMOS Setup Utility

▶ Standard CMOS Features ▶ Advanced BIOS Features ▶ Advanced Chipset Features ▶ Integrated Peripherals ▶ Power Management Setup ▶ PnP/PCI Configurations ▶ PC Health Status	▶ Frequency/Voltage Control Load Fail-Safe Defaults Load Optimized Defaults Set Supervisor Password Set User Password Save & Exit Setup Exit Without Saving
ESC : Quit F9 : Menu in BIOS ↑↓→← : Select Item F10 : Save & Exit Setup	
Time, Date, Hard Disk Type …	

Note:
It is strongly recommended to reload Optimal Setting if CMOS is lost or BIOS is updated.

4.3 Standard CMOS Setup Menu

This setup page includes all the items in standard compatible BIOS. Use the arrow keys to highlight the item and then use the <PgUp>/<PgDn> or <+>/<-> keys to select the value or number you want in each item and press <Enter> key to certify it.

Follow command keys in CMOS Setup table to change **Date**, **Time**, **Drive type**, and **Boot Sector Virus Protection Status**.

Phoenix- AwardBIOS CMOS Setup Utility
Standard CMOS Features

Date (mm:dd:yy)	Fri, Sep 16 2005	Item Help
Time (hh:mm:ss)	11 : 29 : 50	
▶ IDE Channel 0 Master	[Maxtor 91021U2]	Menu Level ▶
▶ IDE Channel 0 Slave	[CD-540E]	
▶ IDE Channel 1 Master	[None]	Change the day, month, year and century
▶ IDE Channel 1 Slave	[None]	
▶ STAT Channel 0 Master	[ST380817AS]	
▶ STAT Channel 0 Master	[None]	
▶ STAT Channel 1 Master	[ST380817AS]	
▶ STAT Channel 1 Master	[None]	
Drive A	[1.4M, 3.5 in.]	
Drive B	[None]	
Video	[EVG/VGA]	
Base Memory	640K	
Extended Memory	1047522K	
Total Memory	1048576K	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

■ **Menu Selections**

Item	Options	Description
Date	mm:dd:yy	Change the day, month, year and century
Time	hh:mm:ss	Change the internal clock
IDE Channel 0 Master	Options are in its sub menu	Press <Enter> to enter the sub menu of detailed options
IDE Channel 0 Slave	Options are in its sub menu	Press <Enter> to enter the next page for detail hard drive settings
IDE Channel 1 Master	Options are in its sub menu	Press <Enter> to enter the next page for detail hard drive settings
IDE Channel 1 Slave	Options are in its sub menu	Press <Enter> to enter the next page for detail hard drive settings
STAT0 Master	Options are in its sub menu	Press <Enter> to enter the next page for detail hard drive settings
STAT1 Master	Options are in its sub menu	Press <Enter> to enter the next page for detail hard drive settings
Drive A Drive B	None 360K, 5.25 in 1.2M, 5.25 in 720K, 3.5 in 1.44M, 3.5 in 2.88M, 3.5 in	Press <Enter> to enter the next page for detail hard drive settings
Video	EGA/VGA CGA 40 CGA 80 MONO	Select the default video device
Base Memory	640K	Displays the amount of conventional memory detected during boot up
Extended Memory	N/A	Displays the amount of extended memory detected during boot up
Total Memory	N/A	Displays the total memory available in the system

4.4 IDE Adaptors Setup Menu

The IDE adapters control the IDE devices, such as hard disk drive or CDROM drive. It uses a separate sub menu to configure each hard disk drive.

Phoenix- AwardBIOS CMOS Setup Utility
IDE Channel 0 Master

IDE HDD Auto-Detection	[Press Enter]	Item Help
IDE Channel 0 Master	[Auto]	Menu Level ►
Access Mode	[Auto]	
Capacity	10246 MB	To atuo-detect the HDD's size, head … on this channel
Cylinder	19852	
Head	16	
Precomp	0	
Landing Zone	19851	
Sector	63	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

■ **Menu Selections**

Item	Options	Description
IDE HDD Auto-detection	Press Enter	Press Enter to auto-detect the HDD on this channel. If detection is successful, it fills the remaining fields on this menu.
IDE Channel 0 Master	None Auto Manual	Selecting 'manual' lets you set the remaining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc. Note: PRECOMP=65535 means NONE!
Access Mode	CHS LBA Large Auto	Choose the access mode for this hard disk
The following options are selectable only if the 'IDE Channel 0 Master 'item is set to 'Manual'		

Capacity	Auto Display your disk drive size	Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk-checking program.
Cylinder	Min = 0 Max = 65535	Set the number of cylinders for this hard disk.
Head	Min = 0 Max = 255	Set the number of read/write heads
Precomp	Min = 0 Max = 65535	**** Warning: Setting a value of 65535 means no hard disk
Landing zone	Min = 0 Max = 65535	****
Sector	Min = 0 Max = 255	Number of sectors per track

Phoenix- AwardBIOS CMOS Setup Utility
SATA 0 Master

IDE HDD Auto-Detection	[Press Enter]	Item Help
Extended IDE Drive	[Auto]	Menu Level ►
Access Mode	[Auto]	To atuo-detect the HDD's size, head … on this channel
Capacity	80GB	
Cylinder	38309	
Head	16	
Precomp	0	
Landing Zone	38308	
Sector	255	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

■ **Menu Selections**

Item	Options	Description
IDE HDD Auto-detection	Press Enter	Press Enter to auto-detect the HDD on this channel. If detection is successful, it fills the remaining fields on this menu.
Extended IDE Drive	None Auto	
Access Mode	Large Auto	Choose the access mode for this hard disk
The following options are selectable only if the 'STAT Channel 0 Master 'item is set to 'Manual'		
Capacity	Auto Display your disk drive size	Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk-checking program.
Cylinder	Min = 0 Max = 65535	Set the number of cylinders for this hard disk.
Head	Min = 0 Max = 255	Set the number of read/write heads
Precomp	Min = 0 Max = 65535	**** Warning: Setting a value of 65535 means no hard disk
Landing zone	Min = 0 Max = 65535	****
Sector	Min = 0 Max = 255	Number of sectors per track

4.5 Advanced BIOS Feature

This section allows you to configure your system for basic operation. You have the opportunity to select the system's default speed, boot-up sequence, keyboard operation, shadowing and security.

Phoenix- AwardBIOS CMOS Setup Utility
Advanced BIOS Features

▶ CPU Feature	[Press Enter]	Item Help
▶ Hard Disk Boot Priority	[Press Enter]	
Virus Warning	[Disabled]	Menu Level ▶
CPU L1 & L2 Cache	[Enabled]	
Quick Power On Self Test	[Enabled]	
First Boot Device	[Hard Disk]	
Second Boot Device	[CD-ROM]	
Third Boot Device	[Floppy]	
Boot Other Device	[Enabled]	
Swap Floppy Drive	[Disabled]	
Boot up Floppy Seek	[Disabled]	
Boot up NumLock Status	[On]	
Gate A20 Option	[Normal]	
Typematic Rate Setting	[Disabled]	
X Typematic Rate (Chars/Sec)	6	
X Typematic Delay (Msec)	250	
Security Option	[Setup]	
APIC Mode	[Enabled]	
MPS Version Control For OS	[1.4]	
Small Logo(EPA) Show	[Disabled]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Phoenix- AwardBIOS CMOS Setup Utility
CPU Feature

Delay Prior to Thermal	[16 Min]	Item Help
Thermal Management	[Thermal Monitor 1]	
X TM2 Bus Ratio	16X	Menu Level ▶
X TM2 Bus VID	0.860V	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Delay Prior to Thermal

The choice: 4 Min, 8 Min, 16 Min, and 32 Min.

Thermal Management

Thermal Monitor 1 (On die throttling); Thermal Monitor 2 (Ratio & VID transition)

The choice: Thermal Monitor 1, Thermal Monitor 2.

Phoenix- AwardBIOS CMOS Setup Utility
Hard Disk Boot Priority

1. ch0 M. : Maxtor 91021U2	Item Help
2. ch2 M. : ST380817AS	
3. ch3 M. : ST380817AS	Menu Level ▶
4. Bootable add-in Cards	Use < ↑ > or < ↓ > to select a device, then press <+> to move it up, or <-> to move it down the list. Press <ESC> to exit this menu.

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Hard Disk Boot Priority

Select Hard Disk Boot Device Priority. Use < ↑ > or < ↓ > to select a device, then press <+> to move it up, or <-> to move it down the list. Press <ESC> to exit this menu.

Bootable Add-in Cards	Select SCSI Device Boot
Ch x M (S).	Select IDE Channel 0,1 Master or Salve Boot
Ch x M.	Select IDE Channel 2 or 3 Master Boot

Virus Warning

Allow you to choose the VIRUS warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and alarm beep.

Enabled	Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
Disabled	No warning message will appear when anything attempts to access the boot sector or hard disk partition table.

CPU L1 Cache/L2 Cache

These two categories speed up memory access. However, it depends on CPU/chipset design.

Enabled	Enable Cache
Disabled	Disable Cache

Quick Power On Self Test

Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.

Enabled	Enable quick POST
Disabled	Normal POST

First/Second/Third Boot Device

Select your boot device priority.

The choice: Floppy, LS120, Hard Disk, CDROM, ZIP 100, USB-FDD, USB-ZIP, USB-CDROM, and Disabled.

Boot Other Device

Select your boot device priority.

The choice: Enabled, Disabled.

Swap Floppy Drive

If the system has two floppy drives, choose enable to assign physical driver B to logical drive A and Vice-Versa.

The choice: Enabled, Disabled.

Boot Up Floppy Seek

Enabled tests floppy drives to determine whether they have 40 or 80 tracks.

The choice: Enabled, Disabled.

Boot Up NumLock Status

Select power on state for NumLock.

The choice: Off, On.

Gate A20 Option

Fast-lets chipsets control Gate A20 and Normal – a pin in the keyboard controller controls Gate A20. Default is Fast.

The choice: Normal, Fast.

Typematic Rate Setting

Keystrokes repeat at a rate determined by the keyboard controller – When enabled, the typematic rate and typematic delay can be selected.

The choice: Enabled, Disabled.

Typematic Rate (Chars/sec)

The rate at which character repeats when you hold down a key.

The choice: 6, 8, 10, 12, 15, 20, 24, and 30.

Typematic delay (Msec)

The delay before keystrokes begin to repeat.

The choice: 250, 500, 750, and 1000.

Security Option

Select whether the password is required every time the system boots or only when you enter setup.

System	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

APIC Mode

The choice: Enabled, Disabled.

MPS Version Control For OS

The choice: 1.1, 1.4.

Small Logo (EPA) Show

The choice: Enabled, Disabled.

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4.6 Advanced Chipset Feature

This section allows you to configure the system based on the specific features of the Intel 915GM chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM (DDR II SO-DRAM) and the external cache. It also coordinates communications between the conventional ISA bus and the PCI bus. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.

Phoenix- AwardBIOS CMOS Setup Utility
Advanced Chipset Features

	DRAM Timing Selectable	[By SPD]
X	CAS Latency Time	4
X	DRAM RAS# to CAS# Delay	3
X	DRAM RAS# Precharge	3
X	Precharge delay (tRAS)	9
X	System Memory Frequency	400MHZ
	SLP_S4# Assertion Width	[1 to 2 Sec.]
	System BIOS Cacheable	[Enabled]
	Video BIOS Cacheable	[Enabled]
	Memory Hole At 15M-16M	[Disabled]
	TV-Out Mode	[NTSC]
	** On-Chip VGA Setting **	
	On-Chip Frame Buffer Size	[8MB]
	DVMT Mode	[DVMT]
	DVMT /FIXED Memory Size	[128MB]
	Boot Display	[CRT]
	Panel Scaling	[Auto]
	Panel Type	[640X480 18bit 1ch]
	TV Standard	[Off]
	Video Connector	[Automatic]
	TV Format	[Auto]
	FWH Write Protection	[Disabled]
	BootBlock Protection	[Disabled]

Item Help

Menu Level ▶

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

This chipset settings deal with CPU access to dynamic random access memory (DRAM). The default timings have been carefully chosen and should only be altered if data is being lost. Such a scenario might well occur if your system had mixed speed DRAM chips installed so that greater delays may be required to preserve the integrity of the data held in the slower memory chips.

DRAM Timing Selectable

This option provides DIMM plug-and-play support by serial presence detect (SPD) mechanism via the system management bus (SMBUS) interface.

The choice: Manual, By SPD.

CAS Latency Time

This option controls the number of SCLKs between the time a read command is sampled by the DRAMs and the time the GMCH samples correspondent data from the DRAMs.

The choice: 3, 4, 5 and Auto.

DRAM RAS# to CAS# Delay

This option controls the number of SCLKs (SDRAM Clock) from a row activate command to a read or write command. If your system installs good quality of SDRAM, you can set this option to "3 SCLKs" to obtain better memory performance. Normally, the option will be set to Auto.

The choice: 2, 3, 4, 5 and Auto.

DRAM RAS# Precharge

This option controls the number of SCLKs for RAS# precharge. If your system installs good quality of SDRAM, you can set this option to "3 SCLKs" to obtain better memory performance. It is set to auto normally.

The choice: 2, 3, 4, 5 and Auto.

Precharge delay (tRAS)

The choice: 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15, Auto.

System Memory Frequency

Users are recommended to use Auto for memory frequency selection.

The choice: 333MHz, 400MHz, 533MHz and Auto.

SLP_S4# Assertion Width

The choice: 4 to 5 Sec., 3to 4 Sec, 2 to 3 Sec., 1 to 2 Sec.

System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

The choice: Enabled, Disabled.

Video BIOS Cacheable

Select "Enabled" to enable caching VGA BIOS into L2 cache to get higher display performance. "Disabled" to ignore this BIOS caching function.

The choice: Enabled, Disabled.

Memory Hole At 15-16M

In order to improve performance, certain space in memory is reserved for ISA cards. This memory must be mapped into the memory space below 16MB.

The choice: Enabled, Disabled.

On-Chip Frame Buffer Size

The choice: 1MB, 8MB.

DVMT Mode

The choice: DVMT, FIXED and BOTH.

DVMT /FIXED Memory Size

The choice: 64MB, 128MB.

Boot Display (Only for ROBO-8718VG2A)

The choice: CRT, LVDS, CRT+LVDS, TV, and CRT+TV.

Panel Scaling (Only for ROBO-8718VG2A)

The choice: Auto, On, Off.

Panel Type

The choice: 640X480 18bit 1ch, 800X600 18bit 1ch, 1024X768 18bit 1ch, 1024X768 24bit 1ch, 1280X1024 24bit 1ch, 1280X1024 24bit 2ch, 1400X1050 18bit 2ch, and 1600X1200 24bit 2ch.

TV Standard

The choice: Off, NTSC, PAL, and SECAM.

Video Connector

The choice: Automatic, Composite, and Component, Both.

TV Format

The choice: Auto, NTSC_M, NTSC_M_J, NTSC_433, NTSC_N, PAL_B, PAL_G, PAL_D, PAL_H, PAL_I, PAL_N, PAL_60, SECAM_L, SECAM_L1, SECAM_B, SECAM_D, SECAM_G, SECAM_H, SECAM_K, SECAM_K1.

FWH Write Protection

The choice: Enabled, Disabled.

BootBlock Protection

The choice: Enabled, Disabled.

4.7 Integrated Peripherals

Phoenix- AwardBIOS CMOS Setup Utility
Integrated Peripherals

▶ OnChip IDE Device	[Press Enter]	Item Help
▶ Onboard Device	[Press Enter]	
▶ Super IO Device	[Press Enter]	Menu Level ▶

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Phoenix- AwardBIOS CMOS Setup Utility
OnChip IDE Device

IDE HDD Block Mode	[Enabled]	Item Help
IDE DMA transfer access	[Enabled]	
On-Chip Primary PCI IDE	[Enabled]	Menu Level ▶
IDE Primary Master PIO	[Auto]	
IDE Primary Slave PIO	[Auto]	If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support
IDE Primary Master UDMA	[Auto]	
IDE Primary Slave UDMA	[Auto]	
On-Chip Secondary PCI IDE	[Enabled]	
IDE Secondary Master PIO	[Auto]	
IDE Secondary Slave PIO	[Auto]	
IDE Secondary Master UDMA	[Auto]	
IDE Secondary Slave UDMA	[Auto]	
*** On-Chip Serial ATA Setting ***		
On-Chip Serial ATA	[Auto]	
X PATA IDE Mode	Secondary	
SATA Port	P0, P2 is Secondary	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

IDE HDD Block Mode

If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

The choice: Enabled, Disabled.

IDE DMA transfer access

The choice: Enabled, Disabled.

OnChip Primary/Secondary PCI IDE

The chipset contains a PCI IDE interface with support for two IDE channels. Select Enabled to activate the primary IDE interface. Select Disabled to deactivate this interface.

The choice: Enabled, Disabled.

IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

The choice: Auto, Mode 0, Mode 1, Mode 2, Mode 3, and Mode 4.

IDE Primary/Secondary Master/Slave UDMA

Ultra DMA/33/66/100 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33/66/100, select Auto to enable BIOS support.

The choice: Auto, Disabled.

On-Chip Serial ATA

Disabled	Disabled SATA Controller
Auto	Auto arrange by BIOS
Combined Mode	PATA and SATA are combined. Max. Of 2 IDE drives in each Channel
Enhanced Mode	Enable both SATA and PATA. Max. Of 6 IDE drives are Supported
SATA Only	SATA is operating in legacy mode

Phoenix- AwardBIOS CMOS Setup Utility
Onboard Device

USB Controller	[Enabled]	Item Help
USB 2.0 Controller	[Enabled]	
USB Keyboard Support	[Enabled]	Menu Level ▶
USB Mouse Support	[Disabled]	
Azalia AC97 Audio Select	[Auto]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

USB Controller

This item allows you to enable/disable USB (Universal Serial Bus) function.

The choice: Enabled, Disabled.

USB 2.0 Controller

This entry is for disable/enable EHCI controller only. This BIOS itself may/may not have high speed USB support built in, the support will be automatically turn on when high speed device were attached.

The choice: Enabled, Disabled.

USB Keyboard Support

This item allows you to enable USB keyboard function under POST, BIOS setup menu, DOS, or Windows-NT with no USB driver loaded.

The choice: Enabled, Disabled.

USB Mouse Support

This item allows you to enabled USB Mouse function under POST, BIOS Setup menu, DOS, or Window-NT with no USB driver loaded.

The choice: Enabled, Disabled.

Azalia AC97 Audio Select

Users can disable on board AC97 Audio function.

The choice: Auto, Azalia, AC97 Audio, and Disabled.

Phoenix- AwardBIOS CMOS Setup Utility
Super IO Device

Onboard FDC Controller	[Enabled]	Item Help
Onboard Serial Port 1	[3F8/IRQ4]	
Onboard Serial Port 2	[2F8/IRQ3]	Menu Level ▶
UART Mode Select	[Normal]	
X RxD, TxD Active	Hi, Lo	
X IR Transmission Delay	Enabled	
X UR2 Duplex Mode	Half	
X Use IR Pins	IR-Rx2Tx2	
Onboard Parallel Port	[378/IRQ7]	
Parallel Port Mode	[SPP]	
X EPP Mode Select	EPP1.7	
X ECP Mode Use DMA	3	
PWRON After PWR-Fail	[Off]	
Watch Dog Timer Select	[Disabled]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Onboard FDC Controller

This item allows you to enable/disable onboard Floppy disk controller.

The choice: Enabled, Disabled.

Onboard Serial Port 1/Port 2

Select an address and corresponding interrupt for the first and second serial ports.

The choice: 3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ4, 2E8/IRQ3, Disabled, Auto.

UART Mode Select

This item allows users to select Infrared transmission mode.

Normal	Disable Infrared function
IrDA	Select IrDA mode transmission
ASKIR	Select ASKIR mode transmission

As Infrared transmission function shares onboard serial port 2, COM2 needs to be enabled.

RxD, TxD Active

This item is to configure Infrared transmission rate. Four options are available :

Hi, Hi	High rate for receiving / High rate for transmitting
Hi, Lo	High rate for receiving / Low rate for transmitting
Lo, Hi	Low rate for receiving / High rate for transmitting
Lo, Lo	Low rate for receiving / Low rate for transmitting

IR Transmission Delay

This option will be available when IR is enabled.

The choice: Enabled, Disabled.

UR2 Duplex Mode

The available choices are full duplex mode and half duplex mode

The choice: Full, Half.

Use IR Pins

The available choices are IR-Rx2Tx2/ RxD2, TxD2.

The choice: IR-Rx2Tx2 / RxD2, TxD2.

Onboard Parallel Port

This item allows you to configure I/O address of the onboard parallel port.

The choice: Disabled, 378/IRQ7, 278/IRQ5, and 3BC/IRQ7.

Parallel Port Mode

There are four different modes for the onboard parallel port:

SPP	Switch to SPP mode
EPP	Switch to EPP mode
ECP	Switch to ECP mode
ECP + EPP	Switch to ECP + EPP mode
Normal	Switch to Normal mode

EPP Mode Select

Select different version of EPP mode.

The choice: EPP1.7, EPP1.9.

ECP Mode Use DMA

Select a proper DMA channel for ECP mode.

The choice: 1, 3.

PWRON After PWR-Fail

This item allows user to configure the power status of using ATX power supply after a serious power loss occurs.

On	System automatically restores power back
Off	System stays at power –off

Watch Dog Timer Select

This BIOS testing option is able to reset the system according to the selected table.

The choice: Disabled, 10 Sec, 20 Sec, 30 Sec, 40 Sec, 1 Min, 2 Min, and 4 Min.

4.8 Power Management Setup

The Power Management Setup allows you to configure you system to most effectively save energy while operating in a manner consistent with your own style of computer use.

Phoenix- AwardBIOS CMOS Setup Utility
Power Management Setup

ACPI Function	[Enabled]	Item Help
ACPI Suspend Type	[S1(POS)]	
X Run VGABIOS if S3 Resume	No	Menu Level ▶
Power Management	[User Define]	
Video Off Method	[DPMS]	
Video Off In Suspend	[Yes]	
Suspend Type	[Stop Grant]	
Suspend Mode	[Disabled]	
HDD Power Down	[Disabled]	
Soft-Off by PWR-BTTN	[Instant-Off]	
Wake-up by On Board LAN	[Disabled]	
Power On by Ring	[Disabled]	
X USB KB Wake-Up From S3	Disabled	
Resume by Alarm	[Disabled]	
X Date(of Month) Alarm	0	
X Time(hh:mm:ss) Alarm	0 : 0 :0	
** Reload Global Timer Events **		
Primary IDE 0	[Disabled]	
Primary IDE 1	[Disabled]	
Secondary IDE 0	[Disabled]	
Secondary IDE 1	[Disabled]	
FDD,COM,LPT Port	[Disabled]	
PCI PIRQ[A-D]#	[Disabled]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

ACPI Function

This item allows you to enable/disable the Advanced Configuration and Power Management (ACPI).

The choice: Enabled, Disabled.

ACPI Suspend Type

To decide which ACPI suspend mode to use.

The choice: S1(POS), S3(STR).

Run VGA BIOS if S3 Resume

The choice: Auto, Yes, No.

Power Management

This category allows you to select the type (or degree) of power saving and is directly related to "HDD Power Down", "Suspend Mode".

There are three selections for Power Management, three of which have fixed mode settings.

Min. Power Saving	Minimum power management. Suspend Mode = 1 Hour, and HDD Power Down = 15 Min.
Max. Power Saving	Maximum power management. Suspend Mode = 1 Min., and HDD Power Down = 1 Min.
User Defined	Allow you to set each mode individually. When not disabled, Suspend Mode ranges from 1 min. to 1 Hour and HDD Power Down ranges from 1 Min. to 15 Min.

Video Off Method

This determines the manner in which the monitor is blanked.

V/H SYNC+Blank	This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer.
DPMS	Initial display power management signaling.

Video Off In Suspend

This allows user to enable/disable video off in Suspend Mode.

The choice: Yes, No.

Suspend Type

Two options are available: Stop Grant and PwrOn Suspend.

The choice: Stop Grant, PwrOn Suspend.

Suspend Mode

When enabled and after the set time of system inactivity, all devices except the CPU will be shut off.

The choice: Disabled, 1 Min, 2 Min, 4 Min, 8 Min, 12 Min, 20 Min, 30 Min, 40 Min, and 1 Hour.

HDD Power Down

When enabled and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

The choice: Disabled, 1 Min, 2 Min, 3 Min, 4 Min, 5 Min, 6 Min, 7 Min, 8 Min, 9 Min, 10 Min, 11 Min, 12 Min, 13 Min, 14 Min, 15 Min.

Soft-Off by PWR-BTTN

This item allows users to set the time to remove the power after the power button is pressed.

The choice: Instant-Off, Delay 4 Sec.

Wake-Up by On Board LAN

This option can be enabled to support Wake Up by on-board LAN.

The choice: Disabled, Enabled.

Power On by Ring

When select "Enabled", a system that is at soft-off mode will be alert to Wake-On-Modem signal.

The choice: Enabled, Disabled.

USB KB Wake-up From S3

The choice: Enabled, Disabled.

Resume by Alarm

This item allows users to enable/disable the resume by alarm function. When "Enabled" is selected, system using ATX power supply could be powered on if a customized time and day is approached.

The choice: Enabled, Disabled.

Date(of Month) Alarm

When "Resume by Alarm" is enabled, this item could allow users to configure the date parameter of the timing dateline on which to power on the system.

The choice: 0 ~ 31.

Time(hh:mm:ss) Alarm

When "Resume by Alarm" is enabled, this item could allow users to configure the time parameter of the timing dateline on which to power on the system.

The choice: hh (0~23), mm (0~59), ss (0 ~59).

Primary/Secondary IDE 0/1

This item is to configure IDE devices being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choice: Enabled, Disabled.

FDD, COM, LPT Port

This item is to configure floppy device, COM ports, and parallel port being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choice: Enabled, Disabled.

PCI PIRQ[A-D]#

This option can be used to detect PCI device activities. If they are activities, the system will go into sleep mode.

The choice: Enabled, Disabled.

4.9 PnP/PCI Configurations

This section describes configuring the PCI bus system. PCI, or **P**ersonal **C**omputer **I**nterconnect, is a system, which allows I/O devices to operate at speeds nearing the speed the CPU itself, uses when communicating with its own special components.

This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

Phoenix- AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

Init Display First	[PCI Slot]	Item Help
Reset Configuration Data	[Disabled]	Menu Level ▶
Resources Controlled By	[Auto(ESCD)]	
X IRQ Resources	Press Enter	Default is disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot.
X DMA Resources	Press Enter	
PCI/VGA Palette Snoop	[Disabled]	
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults		

Init Display First

This item allows you to select the first display port to be initialized.

The choice: PCI Slot, Onboard.

Reset Configuration Data

Default is disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot.

The choice: Enabled, Disabled.

Resource Controlled By

BIOS can automatically configure the entire boot and plug and play compatible devices. If you choose Auto, you cannot select IRQ DMA and memory base address fields, since BIOS automatically assigns them.

The choice: Auto (ESCD), Manual.

IRQ Resources

When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt.

The choice: Press Enter.

Legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PnP for devices compliant with the plug and play standard whether designed for PCI or ISA bus architecture

IRQ-3/IRQ-4/IRQ-5/IRQ-7/IRQ-9/IRQ-10/IRQ-11/IRQ-12/IRQ-14/IRQ-15 assigned to.

The choice: PCI/ISA PnP, Legacy ISA.

DMA Resources

When resources are controlled manually, assign each system DMA channel a type, depending on the type of device using the DMA channel.

Enter for more options DMA-0/DMA-1/DMA-3/DMA-5/DMA-6/DMA-7 assigned to.

Legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PnP for devices compliant with the plug and play standard whether designed for PCI or ISA bus architecture.

The choice: PCI/ISA PnP, Legacy ISA.

PCI/VGA Palette Snoop

The choice: Enabled, Disabled.

4.10 PC Health Status

Phoenix- AwardBIOS CMOS Setup Utility
PC Health Status

CPU Warning Temperature	[Disabled]	Item Help
Current System Temp	42℃/107℉	
Current CPU Temperature	30℃/88℉	Menu Level ▶
Current External Temperature		
CPU Fan Speed	5232 RPM	
System Fan1 Speed	0 RPM (8718VG2A)	
System Fan2 Speed	0 RPM (8718VG2A)	
System Fan Speed	0 RPM (8718UG2A)	
VGA Fan Speed	5921RPM (8718UG2A)	
Vcore	1.28 V	
+1.5V	1.47 V	
+3.3V	3.23 V	
+12V	11.55 V	
+5V	4.99 V	
VBAT (V)	3.24 V	
5VSB (V)	4.96 V	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

CPU Warning Temperature

This item allows you to set a temperature above which the system will start the beeping warning. Default setting is disabled. This function will only with "ACPI" power management and "S3 (STR)" suspends type.

The choices : Disabled, 50℃/122℉, 60℃/140℉, 70℃/158℉.

4.11 Frequency/Voltage Control

Phoenix- AwardBIOS CMOS Setup Utility
PC Health Status

Spread Spectrum	[Disabled]	Item Help
		Menu Level ▶
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults		

Spread Spectrum

This item allows you to enable/disable the spread spectrum modulate

The choice: Enabled, Disabled.

4.12 Default Menu

Selecting "Defaults" from the main menu shows you two options, which are described below

Load Fail-Safe Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Fail-Safe Defaults (Y/N) ? N

Pressing 'Y' loads the BIOS default values for the most stable, minimal-performance system operations.

Load Optimized Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N) ? N

Pressing 'Y' loads the default values that are factory settings for optimal performance system operations.

4.13 Supervisor/User Password Setting

You can set either supervisor or user password, or both of then. The differences between are:

Set Supervisor Password : can enter and change the options of the setup menus.

Set User Password : just can only enter but do not have the right to change the options of the setup menus. When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 3). If the Security option is set to “System”, the password will be required both at boot and at entry to Setup. If set to “Setup”, prompting only occurs when trying to enter Setup.

4.14 Exiting Selection

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit Without Saving (Y/N)? N

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

Chapter 5
Troubleshooting

This chapter provides a few useful tips to quickly get your 96M4220o running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will primarily focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

5.1 Hardware Quick Installation

Backplane

The 96M4220o is a full-sized Single Board Computer, and therefore is only able to run on PICMG PCI/ISA backplane. To know whether your backplane is PICMG PCI/ISA backplane, please contact with vendor or manufacturer.

P4 Power connector

The 96M4220o requires power drawing from at least one or two power connectors (J28 and J16), depending on power mode (AT or ATX). The CPU supplementary Power Connector (J28) has to be connected to a system all the time no matter using AT or ATX mode. Otherwise, the system won't boot up properly. In addition, the 4-pin connector (J16) is only required at ATX mode due to the fact that 4-pin connector provides 5V Stand-by from the backplane to the SBC. If J16 isn't connected, it could also cause system failed to boot up.

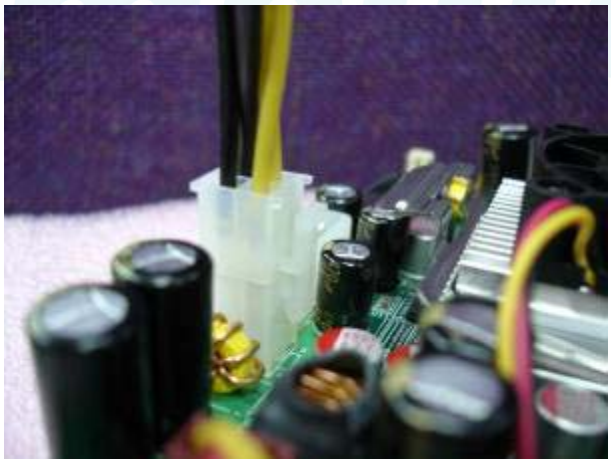

Figure 5-1

ATX Power Setting

This section would be more likely to introduce you how to set up ATX mode on your 96M4220o. Please refer to the following instruction.

Step 1: Connect 20-pin power cable of the ATX POWER with ATX POWER CONNECTOR (20-pin) on the backplane. (Figure 5-2)

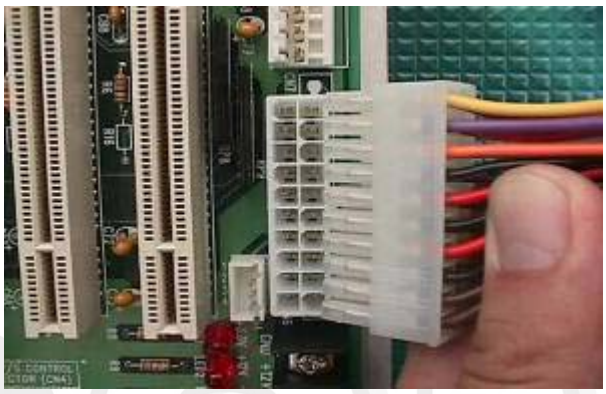

Figure 5-2

Step 2: Use 4-pin power cable to connect both ATX P/S Control Connector on backplane and ATX Power Control (J16) on Signal Board Computer. (Figure 5-3)

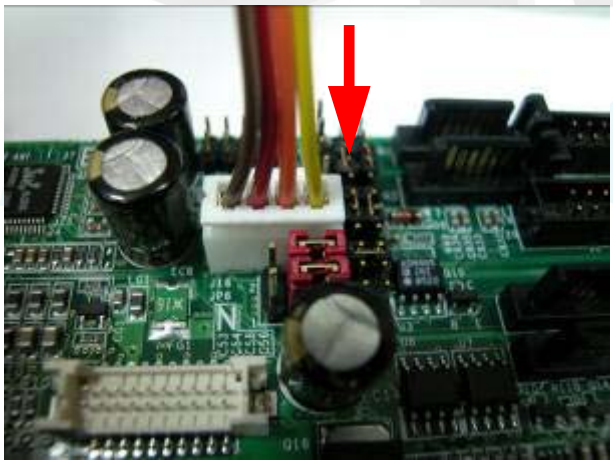

Figure 5-3

Step 3: Please adjust AT/ATX Jumper on JP6 to short 3-5, 4-6 pins, then it can support ATX power scheme. (Figure 5-4)

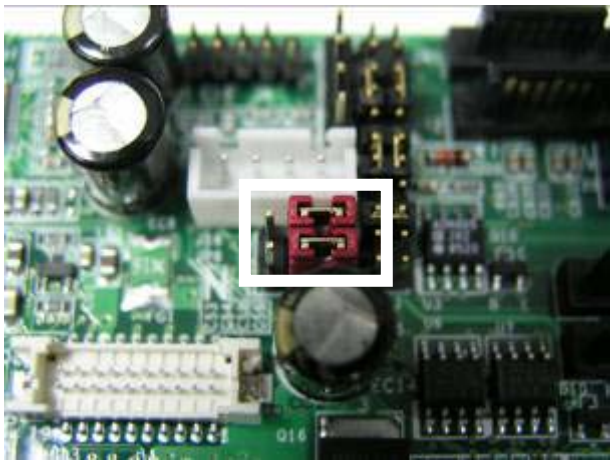

Figure 5-4

Step 4: Please connect 12V Power to CPU supplementary Power Connector (J28), which shows on Figure 5-1.

Step 5: Connect TOGGLE SWITCH with J7 connector on 96M4220o (Figure 5-5), which is used to power on ATX Power Supply. Generally, the TOGGLE SWITCH is located on the chassis of front panel.

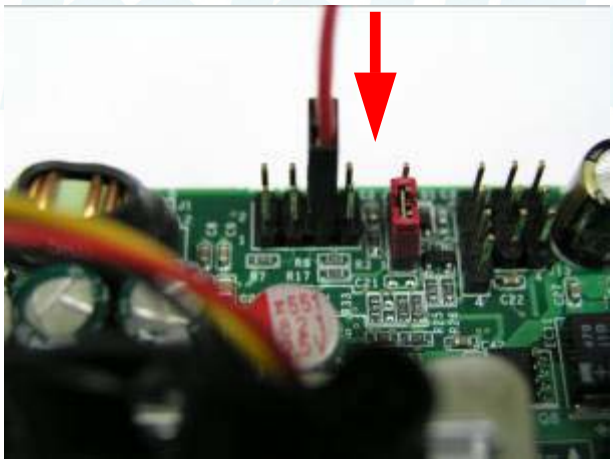

Figure 5-5

AT Power Setting

This section will introduce you how to quickly and appropriately set up AT power on your system.

Step 1: Please adjust AT/ATX Jumper on JP6 to short 1-3, 2-4 pins, then it can support AT power scheme. (Figure 5-6)

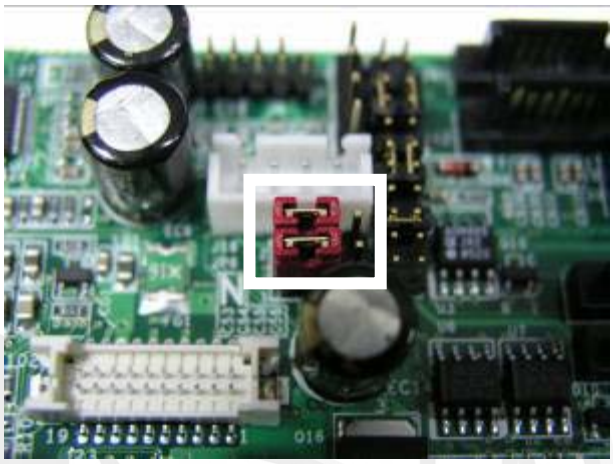

Figure 5-6

Note:
If current Power setting is at ATX mode, please clean CMOS first before adjusting Power setting to AT mode. Otherwise, system would not boot up properly.

Step 2: Remove 4 pins power cable, and then put a jumper back on pin 3 (PS-ON) and pin 4 (GND) of backplane ATX P/S control connector. (Figure 5-7)

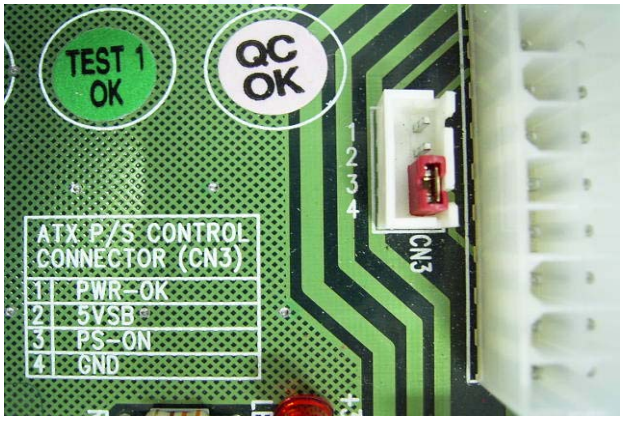

Figure 5-7

Step 3: Please connect 12V Power to CPU supplementary Power Connector (J28), which shows on Figure 5-1.

Stand-alone Setting

The purpose of system stand-alone function is to identify the root cause by isolating the board from other possible system devices such as PCI device, backplane, and so on. Please refer the following steps to make system at stand-alone status.

Step 1: Please connect 4 pins power to J26 in order to make system stand-alone and 12V Power to CPU supplementary Power Connector (J28) (See Figure 5-8)

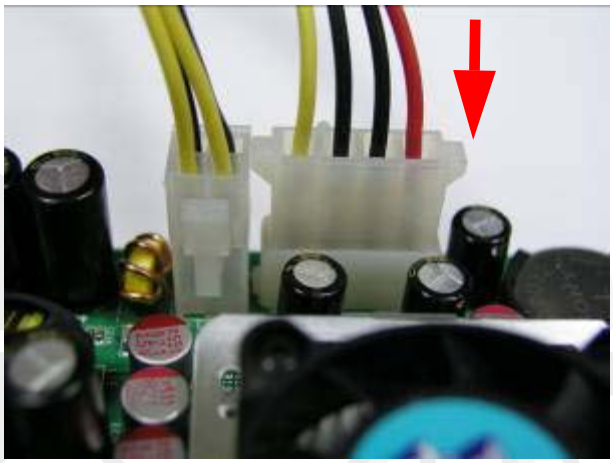

Figure 5-8

Step 2: If you are using ATX power, please short PS-ON and Ground on ATX power connector (As Figure 5-9), and turn on AC power switch of ATX power supply to let system boot up. If you are using AT power supply, you can simply turn on the power on AT power supply to boot up the system.

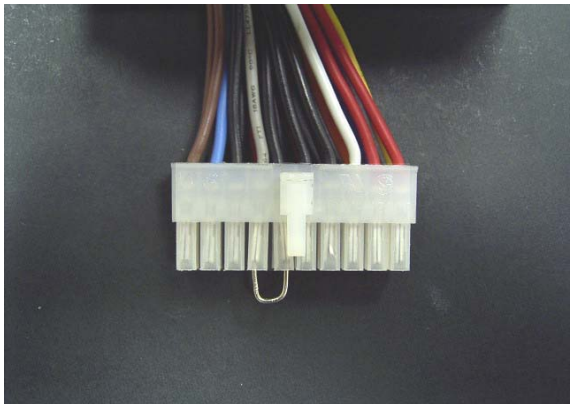

Figure 5-9

Note:
In fact, different power supply has different definition of pin assignments. Therefore, please check Pin assignment on Power Supply or ask your vendor.

Unboot problem

Symptom: After changing power mode from ATX to AT, my system is just not working.

Solution: Due to ICH6 design, when you change your power mode from ATX to AT or from AT to ATX, you have to clean your CMOS in order to make your system boot up properly. To clean CMOS, please short 1-2 pins on JP7 for a moment, and then change it back to its default setting. (Figure 5-10)

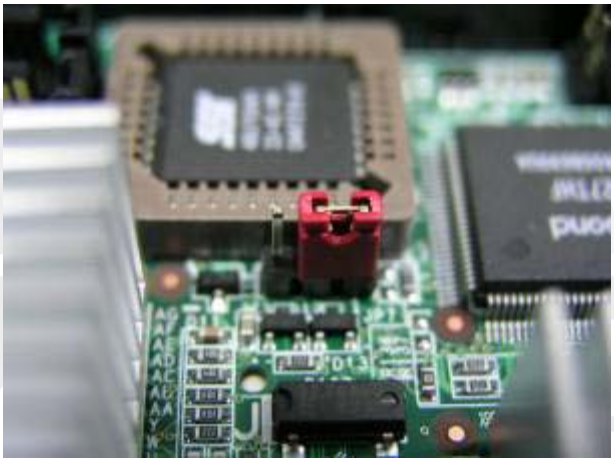

Figure 5-10

Symptom:SBC keeps beeping, and no screen has shown.

Solution: In fact, each beep sound represents different definition of error message. Please refer to table as following:

Beep sounds	Meaning	Action
One long beep with one short beeps	DRAM error	Change DRAM or reinstall it
One long beep constantly	DRAM error	Change DRAM or reinstall it
One long beep with two short beeps	Monitor or Display Card error	Please check Monitor connector whether it inserts properly
Beep rapidly	Power error warning	Please check Power mode setting

Symptom:There is neither no beeps nor screen output.

Solution: Indeed, you shall make the SBC stand-alone to identify the root cause by isolating the board from other possible system devices such as PCI device, backplane, and so on. If the system still cannot boot up, please fill out RMA from which is provided on Portwell website, and then send back to Portwell as a RMA. Besides, you also visit RMA site (www.DSM.AG) to check RMA report if necessary.

5.2 Frequency Asking Questions

Q: How to use Standard PS/2 Keyboard and Mouse?

A: Users can adopt bracket over the J36 jumper interface which supports PS/2 keyboard and mouse function on 96M4220o. (Figure 5-11)

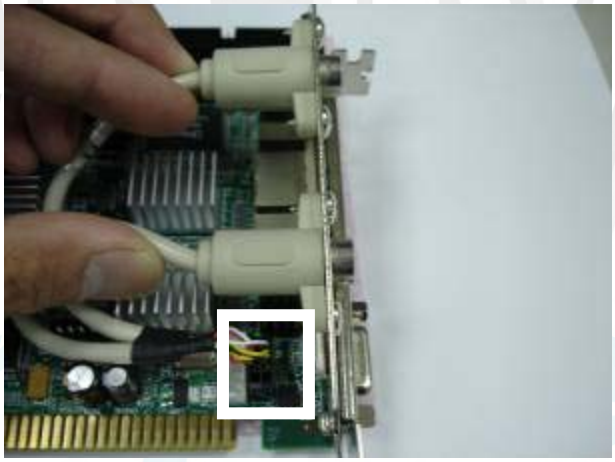

Figure 5-11

Q: What is Serial ATA and how to use it exactly?

The Intel ® 82801FB ICH6 contains two integrated Serial ATA host controllers capable of DMA operation on four ports. Unlike IDE bus, each Serial ATA channel can only connect to one SATA hard disk at a time; there are total four connectors, J21, J22, J41 and J42. The installation of Serial ATA is simpler and easier than IDE, because SATA hard disk doesn't require setting up Master and Slave, which can reduce mistake of hardware installation. All you need to do is to plug in two cables and enable SATA in System BIOS. (The Serial ATA hard disk of installation, please see Figure 5-12 as below)

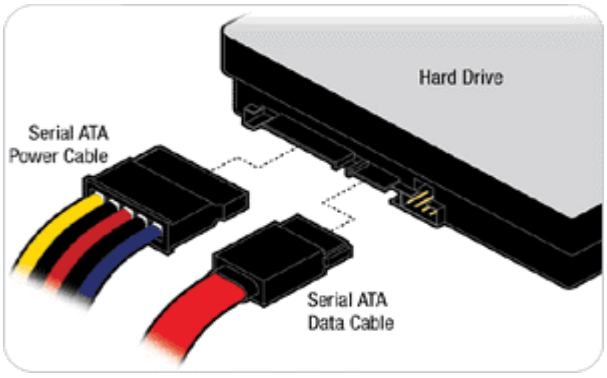

Figure 5-12

After done with the installation of SATA hardware, please enter system BIOS to enable Serial ATA function. Otherwise, Serial hardware won't be recognized. To enable SATA function, please see as following:

System BIOS
- Integrated Peripherals
  - On Chip IDE Device ……[Press enter]
    - On-Chip Serial ATA …….. [Auto]

A: As matter of fact, you need to access system BIOS to enable SATA device. (Please refer to SATA hard disk device installation guide)

Q: I have one IDE hard disk and one SATA hard disk. How can I assign SATA hard disk as First boot device?

A: After entering system BIOS, access Advanced BIOS Feature. And then press enter Hard disk boot Priority. You will see the mode of your SATA hard disk. Select it as first boot device. Every time, when your hard disk devices have been changed, system BIOS will ask you to re-setup Hard disk boot priority.

Q: After inserting Compact Flash, why doesn't it work at all?

A: Compact Flash is occupied with the (Master device of Primary IDE Channel If there is any device occupying this channel, please remove it or set it as a Slave device.

Q: I am using an ATA-66 (or 100) hard drive, how can I know that ATA-66 function is enabled?

A: You need to use the 80-pin ATA-66 IDE flat cable to have this function. During The Post phase, you can see ATA-66 (or 100) message while hard drive is being detected. Besides, after installing Microsoft series OS successfully, you also need to install ATA-66/100 driver to active ATA-66/100 function.

Q: Could the 96M4220o supports RAID function?

A: No, the 96M4220o adopts Intel ® 82801FB ICH6. From Intel spec, it doesn't support Raid function, only 82801FB ICH6-R support Raid function.

5.3 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on AT or ATX power. CPU, CPU Fan, 200-pin DDR2 SDRAM, keyboard, mouse, floppy drive, IDE hard disk, printer, VGA connector, device cables, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with the 96M4220o, it is recommended, when going with the boot-up sequence, to hit "DEL" key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to "**Load Optimal Defaults**", press "Enter" and "Y" to load in default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting any time when system appears to be unstable in boot up sequence.

Auto Detect Hard Disks

In the BIOS => Standard CMOS setup menu, pick up any one from Primary/Secondary Master/Slave IDE ports, and press "Enter". Setup the selected IDE port and its access mode to "Auto". This will force system to automatically pick up the IDE devices that are being connected each time system boots up.

Improper disable operation

There are too many occasions where users disable a certain device/feature in one application through BIOS setting. These variables may not be set back to the original values when needed. These devices/features will certainly fail to be detected.

When the above conditions happen, it is strongly recommended to check the BIOS settings. Make sure certain items are set as they should be. These include the floppy drive, COM1/COM2 ports, Parallel port, USB ports, external cache, on-board VGA and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resource. A few good examples are

Disable COM1 serial port to release IRQ #4
Disable COM2 serial port to release IRQ #3
Disable Parallel port to release IRQ #7
Disable PS/2 mouse to release IRQ #12,
Etc…

A quick review of the basic IRQ mapping is given below for your reference.

IRQ#	Description
IRQ #0	System Timer
IRQ #1	Keyboard
IRQ #2	Unassigned
IRQ #3	COM2
IRQ #4	COM1
IRQ #5	USB 1.0/1.1 UHCI and EHCI 2.0 Controller
IRQ #6	Floppy Disk Controller
IRQ #7	Parallel port
IRQ #8	Real-time Clock
IRQ #9	Microsoft ACPI-Compliant System
IRQ #10	Network Controller /Multimedia Device
IRQ #11	SMbus /Primary IDE Controller
IRQ #12	Network /Display Controller
IRQ #13	Data Processor
IRQ #14	Primary IDE Controller
IRQ #15	Unused

It is then very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resource is not enough, please disable some devices listed above to release further IRQ numbers.

System Memory Address Map

Each On-board device in the system is assigned a set of memory addresses, which also can be identical of the device. The following table lists the system memory address used.

Memory Area	Size	Device Description
0000 – 003F	1K	Interrupt Area
0040 – 004F	0.3K	BIOS Data Area
0050 – 006F	0.5K	System Data
0070 – 0E2E	54K	DOS
0E2F – 0F66	4.9K	Program Area
0F67 – 9F7F	576K	[Available]
= Conventional memory ends at 638K =		
9F80 – 9FFF	2K	Extended BIOS Area
A000 – AFFF	64K	VGA Graphics
B000 – B7FF	32K	Unused
B800 – BFFF	32K	VGA Text
C000 – CE7F	58K	Video ROM
CE80 – CFFF	6K	Unused
D000 – D3FF	16K	ROM
D400 – EEFF	108K	Unused
DA4A –DFFE	22K	High RAM
E000 – EFFF	64K	Temporary Memory Area for BIOS
F000 – FFFF	64K	System ROM

Interrupt Request Lines (IRQ)

Peripheral devices can use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

IRQ#	Current Use	Default Use
IRQ 0	SMARTDRV	System Timer
IRQ 1	SMARTDRV	Keyboard Event
IRQ 2	[Unassigned]	Usable IRQ
IRQ 3	System ROM	COM 2
IRQ 4	System ROM	COM 1
IRQ 5	[Unassigned]	Usable IRQ
IRQ 6	System ROM	Diskette Event
IRQ 7	[Unassigned]	Usable IRQ
IRQ 8	System ROM	Real-Time Clock
IRQ 9	[Unassigned]	Usable IRQ
IRQ 10	[Unassigned]	Usable IRQ
IRQ 11	[Unassigned]	Usable IRQ
IRQ 12	System ROM	IBM Mouse Event
IRQ 13	System ROM	Coprocessor Error
IRQ 14	System ROM	Hard Disk Event
IRQ 15	[Unassigned]	Usable IRQ